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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : B29C 41/28, 35/10, D21F 1/00 B29C 35/02 — A1

(11) International Publication Number: WO 91/14558

(43) International Publication Date: 3 October 1991 (03.10.91)

(21) International Application Number: PCT/GB91/00413

(22) International Filing Date: 18 March 1991 (18.03.91)

(30) Priority data:
9006077.3 17 March 1990 (17.03.90) GB

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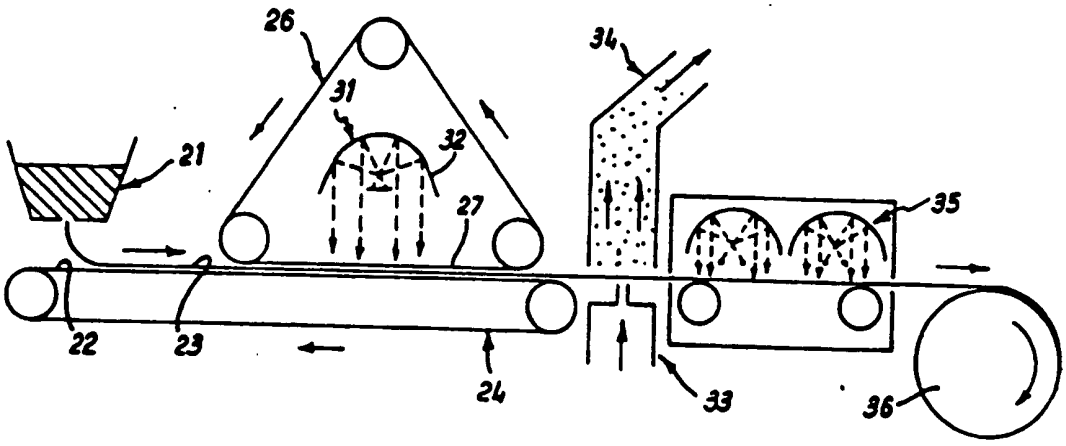
(81) Designated States: AT (European patent), BE (European patent), CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent), US.

Published
With international search report.

(54) Title: PRODUCTION OF PERFORATE STRUCTURES



(57) Abstract

A method of producing an apertured sheet material is proposed wherein a layer (12) of photopolymeric resin material (10) is applied to a moving band (11), an apertured mask (13) which moves in synchronism with the support surface is positioned to overlie the resin material, and the resin material is irradiated through the mask (13) to effect an at least partial cure thereof in regions in register with the apertures (14) in the mask (13). After radiation of the resin material layer (12), uncured such material is removed by pressure fluid jets (16) and final curing of the resin material is effected. Apparatus for practising the method is also disclosed. The apertured sheet material is of use in producing fabrics for, *inter alia*, the papermaking industry.

PRODUCTION OF PERFORATE STRUCTURES

The invention concerns the production of perforate structures and has particular, though not exclusive, reference to flexible structures for use in the papermaking industry.

It is of importance to the production of papermaking and like fabrics that the fabric be of a predetermined and sensibly consistent permeability in order that uniformity of drainage/drying according to the particular stage of the papermaking process involved, might be achieved throughout the full areal extent of the paper sheet as it moves through the papermaking machine.

Conventionally papermakers fabrics include, for example, woven structures or structures defined by interdigitated helical coils to either of which structures there may be added one or more batts of textile fibres. Permeability of the fabric may be reduced by including stuffer yarns in the cross-machine direction of the fabric, be it a woven fabric or a link-belt defined by side-by-side coils, or, in the case of a link belt, by impregnating the same with a foam material or by including strips of an elongate material within some at least of the individual coils.

Accuracy and uniformity of permeability, whilst being controllable in the prior structures, is not ideal, and it is the primary object of the present invention to provide a means whereby specific requirements of a fabric as regards its permeability might more readily be attained in a simple and economic manner.

According to a further preferred feature, the feed means comprises a curtains coater delivering a continuous sheet of fluid polymeric material to the support surface.

The invention will now be described further, by way of example only, with reference to the accompanying drawings in which : -

Fig. 1 is a diagrammatic illustration of the successive steps in the method of the invention; and

Fig. 2 is a diagrammatic view of apparatus for use in practising the invention.

Referring now to Fig. 1 of the drawings, a photopolymeric resin material 10 is applied to the surface of a moving conveyor belt 11, the viscosity of the resin being such as to form a layer 12 of uniform thickness thereon, and a selectively transparent mask 13 is brought into closely spaced relationship with respect to the upper surface of layer 12 for advancing movement therewith. The band 12 includes transparent and opaque regions 14, 15 respectively.

The layer 12 of resin material is subjected to illumination, through the mask 13, of a kind such as will effect at least a partial cure of that material in locations thereof in register with the transparent regions 14 of the mask, the illumination being in a direction normal to the surface of the mask.

After illumination, the mask is moved away from the surface of the layer of photopolymeric material, and such material advances to be subjected to a localised jet of

material, the regions, in the case under consideration, being circles of small diameter provided at close centres.

An elongated ultra violet light source 31 is provided within the loop of endless mask 26, the light source 31 further including a parabolic reflector 32 so positioned as to deliver parallel ultra voilet light to the mask in a direction perpendicular thereto.

The apparatus further includes pressure fluid means 33, preferably a compressed air jet, at a position downstream both of the mask 26 and the band 24, there being extractor means 34 arranged in register with the pressure fluid means 33 and at the opposite side of the layer 23 with respect thereto.

An additional curing means 35 is included downstream of the pressure fluid means 33, the radiation supplied by said curing means being of a kind appropriate to effect curing of the photopolymeric material.

The apparatus is completed by a take-up roll 36 to receive fully cured apertured material.

In one particular example the photopolymeric material used consisted of a blend of acrylated esters and/or urethanes and a photo initiator. The acrylate moieties are the active centres in so far as curing is concerned and the initiator is based on acetophenone.. A 1 mm thick layer of the photopolymeric material was laid on the support surface and the mask was so positioned that the lower

whilst the particular formulation for the photopolymeric material will be selected having regard to the characteristics required in the end product.

If it is required to improve the tensile strength of the sheet material, yarns and/or fibres may be included in the mix applied to the support surface 22 of the endless band 24.

The facility for selective curing of the material applied to the support surface 22 of the endless band 24 which arises from the use of a mask provides for the production of apertured structures of a broad range of permeabilities and this merely by suitable selection of aperture size and spacing. As will be recognised the method of the invention does make possible the creation of a graded permeability towards the edges of the sheet merely by use of a mask of an appropriate form.

The form of reflector is intended to ensure that the light reaching the mask is parallel light, thereby to ensure accuracy in aperture form and size, although it is thought that, by judicious selection of the light source and reflector, apertures having cross-sectional dimensions which vary progressively in the thickness direction of the material may be possible.

Whilst the invention is described in the context of irradiation by ultra voilet light, it is to be recog-

CLAIMS

1. A method of producing a permeable fabric comprising the steps of providing a layer of radiation curable polymeric resin material in fluid form, irradiating said layer of material through a mask selectively transparent to the radiation so as to effect at least partial curing of the material of the sheet in positions corresponding with transparent regions of the mask, removing uncured polymeric material and effecting any necessary full cure of the residual such material.

2. The method as claimed in claim 1, wherein the radiation comprises parallel light directed perpendicularly of the mask.

3. The method as claimed in claim 1 or claim 2, wherein uncured polymeric material is removed by fluid und r pressure.

4. The method as claimed in any one of the preceding claims, wherein the radiation curable polymeric resin material is applied to a moving support surface and the selectively transparent mask is progressed at a linear speed corresponding to that of the support surface.

5. The method as claimed in any one of claims 1 to 3, wherein a fabric is built up in stepwise manner by creating individual panels successively in edge-to-edge abutting relationship with a previously formed panel or panels, the panel in course of creation being cast to

the support surface.

10. Apparatus as claimed in any one of claims 7 to 9, wherein the source of radiation includes a parabolic reflector positioned to deliver parallel light to the mask in a direction perpendicular thereto.

11. Apparatus as claimed in claim 5, or in claim 9 or 10 when dependant thereon, wherein the source of radiation is disposed within the endless loop forming the mask and is co-extensive with the band in the widthwise direction thereof.

12. Apparatus as claimed in any one of claims 7 to 11, further including means adapted to remove uncured polymeric resin material, said means including a source of fluid under pressure adapted to apply a localised jet or jets of pressure fluid to an at least partially cured polymeric resin material existing on the support means.

13. Apparatus as claimed in claim 12, further including additional curing means downstream of the means adapted to remove uncured polymeric resin material.

14. An apertured polymeric resin material produced in accordance with the method claimed in any one of claims 1 to 6.

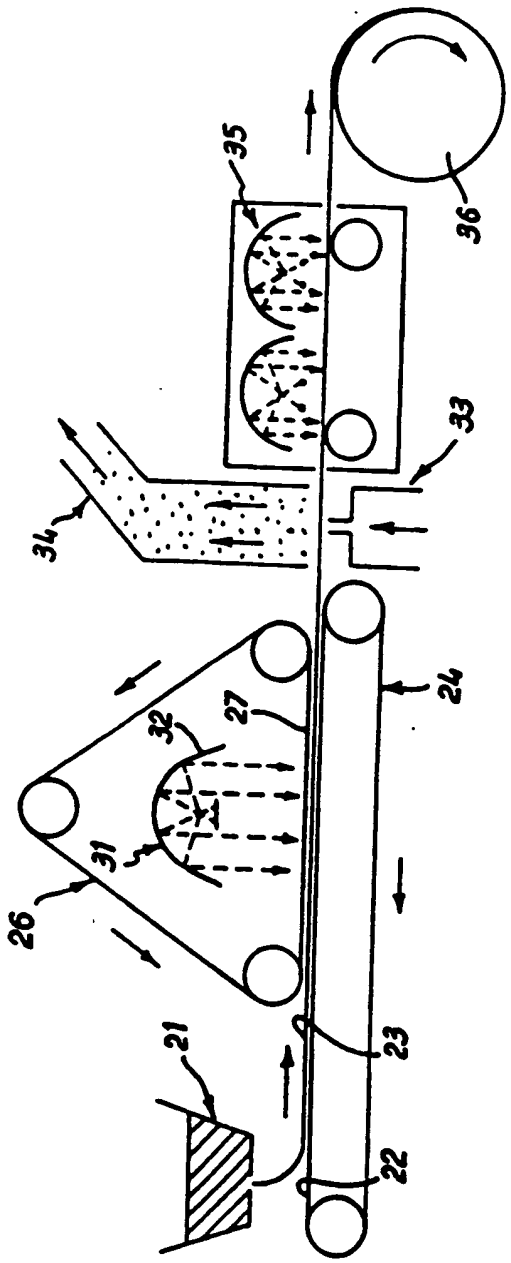


FIG.2

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. GB 9100413 SA 45513

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4514345	30-04-85	None	
EP-A- 0234197	02-09-87	DE-A- 3600577	16-07-87
		JP-A- 62162092	17-07-87
		US-A- 4728530	01-03-88